

Claims:

What is claimed is:

1. An intravascular treatment device, comprising:
a stent locatable interior of an aneurysmal site in a blood vessel; wherein the stent supports the aneurysmal site upon deployment, contracts when the aneurysmal site contracts, and comprises at least one therapeutic agent.
2. The device of claim 1, wherein the stent has a helical configuration.
3. The device of claim 2, wherein the stent comprises at least one helix.
4. The device of claim 3, wherein the stent comprises two helices.
5. The device of claim 4, wherein the stent comprises three helices.
6. The device of claim 1, wherein the stent is self-expandable.
7. The treatment device of claim 1, wherein the stent comprises a polymer.
8. The treatment device of claim 7, wherein the polymer is biodegradable.
9. The treatment device of claim 8, wherein the polymer is cellulose acetate, cellulose acetate propionate, cellulose butyrate, cellulose propionate, cellulose valerate, cumaroneindene polymer, dibutylaminohydroxypropyl ether, ethyl cellulose, ethylene-vinyl acetate copolymer, glycerol distearate, hydorxypropylmethyl cellulose phthalate, 2-methyl-5-vinylpyridine methylate-methacrylic acid copolymer, polyamino acids, polyanhydrides, polycaprolactone, polybutadiene, polyesters, aliphatic polyesters, polyhydroxybutyric acid, polymethyl methacrylate, polymethacrylic acid ester, polyolesters, polysaccharides, such as alginic acid, chitin, chitosan, chondroitin, dextrin, dextran, proteins such as albumin, casein, collagen, gelatin, fibrin, fibrinogen, hemoglobin, transfferrin, vinylchloride-propylene-vinylacetate copolymer, palmitic acid, stearic acid, behenic acid, aliphatic polyesters, hyaluronic acid, heparin, kearatin sulfate, starch, polystyrene, polyvinyl acetal diethylamino acetate, polyvinyl acetate, polyvinyl alcohol, polyvinyl butyral, polyvinyl formal, poly(D,L-

lactide), poly(D,L-lactide-co-glycolide), poly(glycolide), poly(orthoglycolides), poly(orthoglycolide acrylates), poly(ortho acrylates), poly(hydroxybutyrate), poly(alkylcarbonate) and poly(orthoesters), poly(hydroxyvaleric acid), polydioxanone, poly(ethylene terephthalate), poly(malic acid), poly(tartronic acid), polyanhydrides, polyphosphazenes, or blends, admixtures, or co-polymers thereof.

10. The treatment device of claim 8, wherein the therapeutic agent is covalently linked to the polymer.

11. The treatment device of claim 7, wherein the polymer is not biodegradable.

12. The treatment device of claim 11, wherein the polymer is poly(ethylene-vinyl acetate) ("EVA") copolymers, silicone rubber, polyamides (nylon 6,6), polyurethane, poly(ester urethanes), poly(ether urethanes), poly(ester-urea), polypropylene, polyethylene, polycarbonate, PEEK, polytetrafluoroethylene, expanded polytetrafluoroethylene, polyethylene terephthalate (Dacron), polypropylene or blends, admixtures, or co-polymers thereof.

13. The treatment device of claim 7, wherein the polymer is a pH-sensitive polymer.

14. The treatment device of claim 13, wherein the pH-sensitive polymer is poly(acrylic acid) or its derivatives; poly(acrylic acid); poly(methyl acrylic acid), copolymers of poly(acrylic acid) and acrylmonomers; cellulose acetate phthalate; hydroxypropylmethylcellulose phthalate; hydroxypropyl methylcellulose acetate succinate; cellulose acetate trimellitate; or chitosan.

15. The treatment device of claim 7, wherein the polymer is a temperature-sensitive polymer.

16. The treatment device of claim 15, wherein the temperature-sensitive polymer is poly(N-methyl-N-n-propylacrylamide; poly(N-n-propylacrylamide); poly(N-methyl-N-isopropylacrylamide); poly(N-n-propylmethacrylamide; poly(N-isopropylacrylamide);

poly(N,n-diethylacrylamide); poly(N-isopropylmethacrylamide); poly(N-cyclopropylacrylamide); poly(N-ethylmethacrylamide); poly(N-methyl-N-ethylacrylamide); poly(N-cyclopropylmethacrylamide); poly(N-ethylacrylamide); hydroxypropyl cellulose; methyl cellulose; hydroxypropylmethyl cellulose; and ethylhydroxyethyl cellulose, or pluronics F-127; L-122; L-92; L-81; or L-61 or copolymers thereof.

17. The treatment device of claim 1, wherein the stent comprises metal.
18. The treatment device of claim 19, wherein the metal is a metal alloy.
19. The treatment device of claim 18, wherein the metal alloy is NiTi.
20. The treatment device of claim 1, wherein the therapeutic agent is at least one of a metalloproteinase inhibitor, cyclooxygenase-2 inhibitor, anti-adhesion molecule, tetracycline-related compound, beta blocker, NSAID, or an angiotensin converting enzyme inhibitor.
21. The treatment device of claim 20, wherein the cyclooxygenase-2 inhibitor is Celecoxib, Rofecoxib, Parecoxib, green tea, ginger, turmeric, chamomile, Chinese gold-thread, barberry, Baikal skullcap, Japanese knotweed, rosemary, hops, feverfew, oregano, piroxicam, mefenamic acid, meloxicam, nimesulide, diclofenac, MF-tricyclide, raldecoxide, nambumetone, naproxen, herbimycin-A, or etoicoxib.
22. The treatment device of claim 20, wherein the anti-adhesion molecule is anti-CD18 monoclonal antibody.
23. The treatment device of claim 20, wherein the tetracycline-related compound is doxycycline, aureomycin, chloromycin, 4-dedimethylaminotetracycline, 4-dedimethylamino-5-oxytetracycline, 4-dedimethylamino-7-chlorotetracycline, 4-hydroxy-4-dedimethylaminotetracycline, 5 a, 6-anhydro-4-hydroxy-4-dedimethylaminotetracycline, 6-demethyl-6-deoxy-4-dedimethylaminotetracycline, 4-dedimethylamino-12a-deoxytetracycline, 6 α -deoxy-5-hydroxy-4-dedimethylaminotetracycline, tetracyclinonitrile, 6- α -benzylthiomethylenetetracycline, 6-fluoro-6-demethyltetracycline, or 11- α -chlorotetracycline.

24. The treatment device of claim 20, wherein the beta blocker is acebutolol, atenolol, betaxolol, bisoprolol, carteolol, carvedilol, esmolol, labetolol, metoprolol, nadolol, penbutolol, pindolol, propranolol, or timolol.
25. The treatment device of claim 20, wherein the NSAID is indomethacin, ketorolac, ibuprofen or aspirin.
26. The treatment device of claim 20, wherein the angiotensin converting enzyme inhibitor is captopril or lisinopril.
27. The treatment device of claim 20, wherein the angiotensin converting enzyme inhibitor is enalaprilat, fosinoprilat, benazeprilat, trandolaprilat, quinaprilat, ramiprilat, moexiprilat, or perindoprilat.
28. The treatment device of claim 7, wherein the therapeutic agent is contained in a microsphere associated with the polymer.
29. The treatment device of claim 28, wherein in microsphere is about 50 nm to 500 μm in size.
30. The treatment device of claim 29, wherein the spray is prepared from microspheres of about 0.1 μm to about 100 μm in size.
31. The treatment device of claim 1, wherein the therapeutic agent is applied as a coating to the stent.
32. The treatment device of claim 31, wherein the coating is applied as a paste, thread, film or spray.
33. The treatment device of claim 32, wherein the film is from 10 μm to 5 mm thick.
34. The treatment device of claim 31, further comprising a second coating deposited over the therapeutic coating.

35. The treatment device of claim 34, wherein there are at least two therapeutic coatings, wherein each therapeutic coating is separated by a second coating.
36. The treatment device of claim 31, wherein the coating is a biodegradable coating.
37. The treatment device of claim 36, wherein the polymer is cellulose acetate, cellulose acetate propionate, cellulose butyrate, cellulose propionate, cellulose valerate, cumaroneindene polymer, dibutylaminohydroxypropyl ether, ethyl cellulose, ethylene-vinyl acetate copolymer, glycerol distearate, hydroxypropylmethyl cellulose phthalate, 2-methyl-5-vinylpyridine methylate-methacrylic acid copolymer, polyamino acids, polyanhydrides, polycaprolactone, polybutadiene, polyesters, aliphatic polyesters, polyhydroxybutyric acid, polymethyl methacrylate, polymethacrylic acid ester, polyolesters, polysaccharides, such as alginic acid, chitin, chitosan, chondroitin, dextrin, dextran, proteins such as albumin, casein, collagen, gelatin, fibrin, fibrinogen, hemoglobin, transferrin, vinylchloride-propylene-vinylacetate copolymer, palmitic acid, stearic acid, behenic acid, aliphatic polyesters, hyaluronic acid, heparin, keratin sulfate, starch, polystyrene, polyvinyl acetal diethylamino acetate, polyvinyl acetate, polyvinyl alcohol, polyvinyl butyral, polyvinyl formal, poly(D,L-lactide), poly(D,L-lactide-co-glycolide), poly(glycolide), poly(orthoglycolides), poly(orthoglycolide acrylates), poly(ortho acrylates), poly(hydroxybutyrate), poly(alkylcarbonate) and poly(orthoesters), poly(hydroxyvaleric acid), polydioxanone, poly(ethylene terephthalate), poly(malic acid), poly(tartronic acid), polyanhydrides, polyphosphazenes, or blends, admixtures, or co-polymers thereof.
38. The treatment device of claim 31, wherein the coating is a time release coating.
39. The treatment device of claim 38, wherein the time release coating releases from about 1% to about 25% of the therapeutic agent within 10 days after deployment.
40. The treatment device of claim 1, wherein the stent is formed by casting or laser cutting.
41. The treatment device of claim 1, wherein the stent is deployed by a catheter.

42. A method of treating an aneurysm comprising deploying the device of claim 1 in an aneurysmal site.

43. An intravascular treatment device, comprising a helical stent locatable interior of an aneurysmal site in a blood vessel; wherein the stent supports the aneurysmal site upon deployment, contracts when the aneurysmal site contracts, and comprises at least one therapeutic agent.

44. The treatment device of claim 43, wherein the stent is biodegradable.

45. The treatment device of claim 44, wherein the stent comprises poly(orthoester).

46. The method of treating an aneurysm as in Claim 42 further comprising deploying a stent graft to exclude the aneurysm the a substantial portion of device of Claim 1 is disposed between the stent graft and the wall of the aneurysm.

47. The method of treating an aneurysm as in Claim 46, wherein said therapeutic agent is inactive until it comes in contact with an activating agent.